

one member selected from the group consisting of Ni: 0.4% or less, excluding 0%; V: 0.4% or less, excluding 0%; Mo: 0.05 to 0.5%; and Nb: 0.05 to 0.5%; and a remainder consisting essentially of Fe and inevitable impurities; wherein: the steel wire has a prior austenite grain size number of from 11.0 to 14.0; and a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) in the steel wire is from 0.67 to 0.85" (emphasis added). Hashimura and Metals Handbook do not disclose or suggest such a wire.

Applicants submit that Hashimura and Metals Handbook fail to disclose or suggest each and every feature of claim 1 (and particularly the recited range of prior austenite grain size numbers and the recited range of ratios ( $\sigma_{0.2}/\sigma_B$ )) for at least the reasons discussed in Applicants' previous response – Applicants continue to submit that a *prima facie* case of obviousness has not been made.

However, even if a *prima facie* case were made, such case is rebutted by the results shown in the present specification – "[a] *prima facie* case of obviousness ... is rebuttable by proof that the claimed compounds possess unexpectedly advantageous or superior properties." See MPEP §2144.09 (citing *In re Papesch*, 315 F.2d 381 (C.C.P.A. 1963)). Based on the comments and suggestions set forth at page 9 of the Office Action, Applicants have undertaken experimentation to supplement the experimentation described in the Declaration Under 37 C.F.R. §1.132 ("Declaration I") filed on December 22, 2009 and in the present specification. The supplemental experimentation is described in the Declaration Under 37 C.F.R. §1.132 ("Declaration II") filed herewith.

Test steel 1 in Declaration II has a chemical composition and a grain size number that are within the scope of Claim 1, but has a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.65, which is below the lower limit recited in claim 1. See Declaration II, page 2. Because Test steel 1 has a ratio ( $\sigma_{0.2}/\sigma_B$ ) that is below the lower limit recited in claim 1, the steel exhibits sag resistance (0.285%) that

is inferior to that achieved by steels according to claim 1 ( $\leq 0.175\%$ ). *Compare* Declaration II, page 3; present specification, page 21.

The Test steel of Declaration I has a chemical composition and a grain size number that are within the scope of Claim 1, but has a ratio ( $\sigma_{0.2}/\sigma_B$ ) of 0.861, which is above the upper limit recited in claim 1. *See* Declaration I, page 2. Because the Test steel of Declaration I has a ratio ( $\sigma_{0.2}/\sigma_B$ ) that is above the upper limit recited in claim 1, the steel exhibits fatigue life ( $\leq 80 \times 10^5$  cycles) that is inferior to that achieved by steels according to claim 1 ( $\geq 100 \times 10^5$  cycles). *Compare* Declaration I, page 3; present specification, page 21.

Accordingly, the results for Test steel 1 of Declaration II and the Test steel of Declaration I demonstrate the criticality of the range of ratios ( $\sigma_{0.2}/\sigma_B$ ) recited in claim 1.

Test steel 2 in Declaration II has a chemical composition and a ratio ( $\sigma_{0.2}/\sigma_B$ ) that are within the scope of Claim 1, but has prior austenite grain size number of 14.5, which is above the upper limit recited in claim 1. *See* Declaration II, page 2. Because Test steel 2 has a prior austenite grain size number that is above the upper limit recited in claim 1, the steel exhibits inferior fatigue life ( $85 \times 10^5$  cycles) and workability (breakage in coiling test) to that achieved by steels according to claim 1 ( $\geq 100 \times 10^5$  cycles; no breakage in coiling test). *Compare* Declaration II, page 3; present specification, page 21.

Example No. 10 in the present specification has a chemical composition (H2) and a ratio ( $\sigma_{0.2}/\sigma_B$ ) that are within the scope of Claim 1, but has prior austenite grain size number of 10.5, which is below the lower limit recited in claim 1. *See* present specification, page 21. Because Example No. 10 has a prior austenite grain size number that is below the lower limit recited in claim 1, the steel exhibits inferior fatigue life ( $31 \times 10^5$  cycles) and sag resistance (0.250%) to that achieved by steels according to claim 1 ( $\geq 100 \times 10^5$  cycles;  $\leq 0.175\%$ ). *See* present specification, page 21.

Accordingly, the results for Test steel 2 of Declaration II and Example No. 10 of the present specification demonstrate the criticality of the range of prior austenite grain size numbers recited in claim 1.

The foregoing results are objective evidence of the improvements of the steels of claim 1 over known steels as in Hashimura, and thus these results rebut any suggestion that it would have been obvious to modify the steels of Hashimura in view of the teachings of Metals Handbook.

As explained, claim 1 would not have been rendered obvious by Hashimura and Metals Handbook. Claims 2-7 depend from claim 1 and, thus, also would not have been rendered obvious by Hashimura and Metals Handbook. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### Double Patenting

The Office Action rejects claims 1-7 under the judicially created doctrine of obviousness-type double patenting over claims 1-14 of U.S. Patent No. 7,615,186 in view of Metals Handbook.

Claims 1-14 of the 186 patent do not recite or suggest the range of prior austenite grain size numbers or the range of ratios ( $\sigma_{0.2}/\sigma_B$ ) of 0.2% proof stress ( $\sigma_{0.2}$ ) to tensile strength ( $\sigma_B$ ) recited in claim 1 of the present application. For at least the reasons discussed above with respect to the rejection over Hashimura and Metals Handbook, one of ordinary skill in the art would not have modified the steels of the claims of the 186 patent as would be required to obtain steels satisfying the ranges of claim 1.

Accordingly, claim 1 of the present application is not obvious over claims 1-14 of the 186 patent in view of Metals Handbook. Claims 2-7 depend from claim 1 and, thus, also are

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not obvious over claims 1-14 of the 186 patent in view of Metals Handbook. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

For the foregoing reasons, Applicants submit that claims 1-7 are in condition for allowance. Prompt reconsideration and allowance are respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



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Richard L. Treanor  
Attorney of Record  
Registration No. 36,379

Jacob A. Doughty  
Registration No. 46,671

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)

Attachment:  
Declaration Under 37 C.F.R. §1.132